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MANUAL OF CHIROPODY.

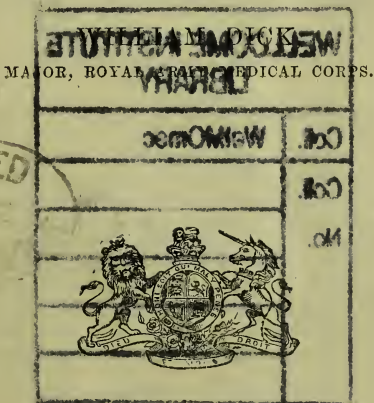
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MANUAL OF CHIROPODY.

CHAPTER I

"ELEMENTARY ANATOMY OF THE (SOLDIER'S) FOOT."

BEFORE proceeding to the consideration of the prevention and cure of the common ailments to which the foot is liable, it is very necessary, for their correct understanding, that you should know something of its shape and construction. This can best be studied from three points of view, in each case dealing with main principles rather than with details.

- (1) The general shape of the human foot.
- (2) The principal structures which enter into its formation, with their uses and relationship to one another.
- (3) The minute structure of the skin which covers the foot.

(1).—*The General Shape of the Human Foot.*

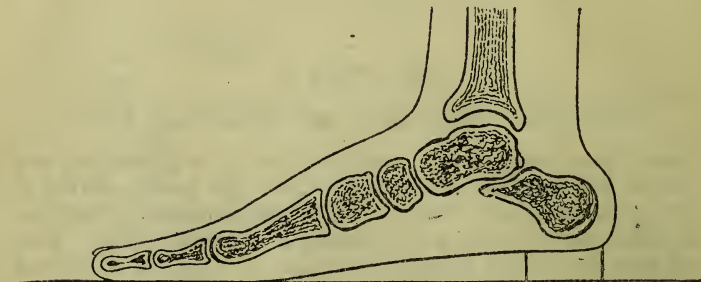
If you look at your own foot, from the side, you will see that it is placed at right angles to the leg from before backwards, and that it can be moved freely in that direction on a sort of hinge joint at the ankle. The foot can move but little from side to side, and that little is to a great extent amongst the small bones of the foot, rather than at the ankle joint.

Looked at sideways, the foot is more or less triangular in shape, the angles being rounded, the apex at the ankle joint and the two other angles the toes and heel respectively. The base of this triangle, formed by the sole of the foot, is straight (flat) on the outer side, and touches the ground along its whole extent; while on the inner side (except in flat-footed persons) it is arched, and only presses the ground at the heel and at the ball of the foot under the roots of the toes. The front portion of this triangle, *i.e.*, the instep, is longer than the back portion or heel, and is shaped like a wedge. When the foot is bearing the weight of the body, and is enclosed in a boot, this wedge is forced forwards into the front portion of the boot. The rear

portion, or heel, is comparatively short, and is said to vary in length or direction in different races and individuals.

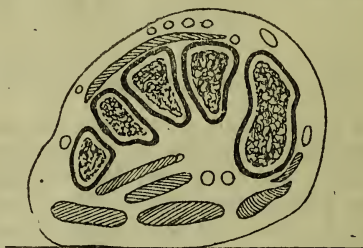
FIG. I.

(a)



Section through foot longways, showing the bones of the longitudinal arch.

(b)



Section through foot crossways, showing the bones of the transverse arch of one foot (see on fig. III), and also the small muscles and tendons of the foot, cut across.

If we were to cut a cross-section of the foot just in front of the ankle joint, its surface would also be roughly triangular or wedge shaped. The point of this wedge is on the outer side, where the side of the foot fits into the boot between its sole and upper. When the foot is bearing the weight of the body, this wedge is forced into the boot in a downwards and outwards direction.

The toes of a naturally formed foot are distinct from one another, and, like the fingers, each has its own position and individual direction. The great toe is the largest, thickest, and most important of all, as it is on this toe that we throw

much of the weight in standing. It is in a straight line with the inner side of the foot when at rest, and when the bare foot is supporting the body weight, this toe tends to spread away from the others. This is a very different state of things from that met with in feet which have become deformed from wearing sharp-pointed boots, when the great toe is forced on to the others towards the middle line of the foot.

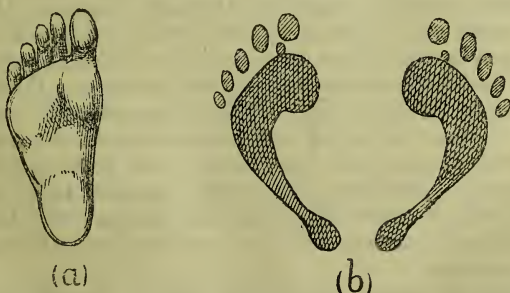
The marching power of the foot is destroyed in direct proportion to the divergence of the foot from the form in which nature meant it to grow.

The sole of the foot may be naturally divided into the tread (or ball) in front, the heel behind, and the waist between, under the instep.

When we stand upon the soles of our feet, only a portion of their surfaces is in contact with the ground, an amount which varies slightly with the pressure which the foot has to support. If we step from our bath on to a boarded or concrete floor, or blacken the soles of our feet, and step lightly on to a sheet of paper, an impression will be made somewhat like that in Fig. II (*b*).

A firm, decided impression will be seen where the heel, the ball of the foot, and the outer side of the foot have pressed the ground, and also under the pads of the five toes. This impression (unless we are flat-footed) gradually merges into a clear space under the arch of the foot. We rest on the heel, tread on the ball of the foot and great toe, while gripping the ground and balancing with the other four toes.

FIG. II.



(a) Sole of natural foot. (b) Impression made when standing at "attention" on dry boards with wet, bare feet.

Such is the usual and natural shape of the human foot; but it must be remembered that it differs slightly in different

individuals, and greatly in those who have abused their feet by wearing unsuitable boots. Some feet are broad in proportion to their length, some vary in the height of the instep, &c., consequently we have boots, not only of different lengths (sizes), but also of different magnitudes for each length. As the foot is not rigid, but is able to give within certain limits when strain is put upon it, so it will vary somewhat in shape, according to the amount of pressure or weight it has to support. Both the length and breadth of a foot "at rest" differ from those of the same foot when bearing the weight of the body, a point of importance to those whose duty it is to fit boots.

All the above points have a definite bearing on the construction and fitting of the soldier's boots and shoes, and on the prevention of those ailments to which his foot is liable; the relative importance of which will become more obvious later on.

(2.)—*The Principal Structures which enter into the Formation of the Foot : their Uses and Relationship to one another.*

If we could pull a foot to pieces, we should find that it was composed of the following structures :—

- (a.) A bony framework.
- (b.) Ligaments or fibrous bands.
- (c.) Joints between the bones.
- (d.) Tendons and muscles.
- (e.) Loose tissue and fat, blood-vessels, and nerves.
- (f.) Fibrous sheaths and skin.

(a.) The *bony framework* consists of a number of small bones, which, though securely attached to one another, are able to move to a limited extent. They help to break the force of any jar or fall on to the feet and limit any tendency to recoil, and their shape and position determines the general conformation of the foot. They form natural arches, a form of support which is well recognised as the strongest in existence, and the one used for making bridges, viaducts, &c. Moreover, its special construction out of a number of parts, each of which can give a little, makes it still stronger and more able to withstand unusual and sudden pressure.

The hollow arches of the foot are so designed to give strength and elasticity to the foot, to break the shock of any accidental concussion, and to protect the blood-vessels, nerves, and small muscles of the sole from pressure.

(b.) These bony arches are bound together by strong

fibrous bands called *ligaments*, which act as cross beams or tie rods, and also unite the contiguous edges of the bones together, and while they allow a certain amount of movement or play between the bones, they limit dangerous displacement, and take much of the jar of any concussion to

FIG. III.



Transverse section through both feet, showing arches formed by the bones of both feet.

which the foot may be subjected. Beneath the skin of the sole there is also a strong layer of fibrous tissue, passing from the heel to the toes, which also assists in this direction. These ligaments are not elastic, and can sustain a certain amount of strain, but if too severely strained they rupture. If, however, they are continuously stretched for days, they gradually give and become lax.

(c.) The ligaments joining the bones, together with those bones and closed sacs of shining membrane between their contiguous surfaces, form *joints*. The smooth membrane is capable of exuding a small amount of fluid into the closed sac, which acts as a lubricant, and so allows the bones to move smoothly one upon another. A similar sac is to be found over the inner side and slightly under the base of the great toe, where it relieves any pressure to which that part may be subjected, acting as a sort of water cushion. Undue pressure on this sac, from boots with pointed toes, is apt to cause it to become inflamed and enlarged, resulting in a painful condition known as bunion.

(d.) Passing from the muscles of the legs to the toes and bones of the feet are a number of tendons. These enable us to move the toes and other portions of the foot, and also serve to brace up and support the arches of the foot under ordinary conditions, taking the strain of the body weight off the ligaments. If these get weak, the strain falls on the ligaments, which, after a time, stretch and let the arch fall, and "flat-foot" results. These tendons may be felt round the ankle joint. Some come round a pulley on the inner side of the ankle, and crossing under the sole pass to the

toes; others pass from the leg to the bones in the summit of the arch; others round the outer side of the foot in grooves and across under the sole. These muscles are always braced up or taut from unconscious contraction, and increase or decrease in size and strength in direct proportion to the amount of *regular* work they are habitually accustomed to perform, up to a certain point. If worked beyond this point at all continuously, they become over-tired and exhausted, and lose their power of bracing up the arches of the foot. Muscles that have been judiciously developed in youth need only a little regular (daily) exercise to keep them in condition. Those who stand on their feet continuously for hours (shopmen, &c.), and those who habitually wear unyielding boots, suffer from wasting and slackness of these muscles, with consequent flatness of the feet. The arches of the foot are seldom present in infancy, but gradually develop as the muscles come into action.

(e.) Between all these structures is a variable amount of fat and loose tissue, which acts as a sort of padding. There are also the necessary blood-vessels and nerves.

(f.) Enveloping the whole, and passing up between the muscles, tendons, &c., is a strong sheath of fibrous tissue, which helps to protect these structures and keep them in their proper positions. It is strong over the sole of the foot.

Outside all is a covering of skin, freely movable over the upper surface of the foot, but more firmly attached to the sole so as not to slip about. In thickness it varies according to the work it is expected to perform, being thickest over the sole, and especially thick over the soles of those who work barefoot. It is thinner on the upper surface and under and round the joints of the toes where much flexibility is required.

(3.)—*The Minute Structure of the Skin which covers the Foot.*

If we cut very thin sections of the skin through its thickness and look at them under the microscope, we find that the skin is formed of three layers, differing considerably from one another:—

- (a.) The superficial horny layer.
- (b.) The middle mucous layer.
- (c.) The deep layer or true skin.

(a.) The *superficial layer* is composed of tough, horny, elastic tissue, formed of numbers of tiny cells arranged in

layers (Fig. IV). As fast as these cells become rubbed off the surface by the wear and tear of daily life, new ones form in the deepest part, derived from the top cells of the next or mucous layer. These new deeper cells gradually come to the surface, new ones being formed below them which force them forwards, until as the superficial cells of the body are worn off these replace them, only in turn to be themselves worn off and replaced by others. The new cells which form this layer, derived from the mucous layer, harden by evaporation as they progress towards the surface, become more horny and tough, so as to be fitted for their protective purpose. In this manner we are able to maintain our covering of skin in spite of the daily wear and tear to which it is subjected. The growth of new cells is directly proportionate to the amount of friction or pressure to which the skin is exposed. It is extremely thick on the soles of those who go barefoot, less thick in the soles of the average man who wears boots, and becomes quite thin and soft in those who are confined to bed for any lengthy period, or unable to use their feet. Small local thickenings in this layer are known as corns.

(b.) The *second*, middle, or mucous *layer* is much softer than the last, but is also composed of a number of cells. It is very constant in its thickness all over the body, and its superficial cells gradually pass to the horny layer above. The deeper cells contain the pigment or colouring matter, which causes the different tints met with in the skins of different individuals and races. The under or deep surface of this layer is accurately adapted (or moulded) to the third layer beneath, which latter is covered with papillæ or elevations. This soft mucous layer allows any fluid that may be exuded from the blood-vessels below to pass through its meshes, but the horny superficial layer above will not. When, therefore, a large amount of fluid is exuded, it collects under the superficial layer, which it strips off the mucous layer, and so a blister is formed. Neither the first nor the second layer have any blood-vessels or nerves in them, and therefore do not bleed nor hurt when cut, and so form an insensitive covering or protection to the true skin. They also limit evaporation from the deeper blood-vessels.

(c.) The *third* or deepest *layer* is called the "true skin." It is a dense, tough, but at the same time elastic tissue, made up of interwoven bundles of fibres. It is from this part of the skin that leather is made. This third layer contains numerous blood-vessels, the contents of which give the pink colour to the skin. Its upper surface is covered

with a number of small conical projections or papillæ, in which the nerves of sensation end in bulbous swellings (Fig. IV), enabling us to appreciate pressure, pain, &c., and so constituting the sense of touch. These papillæ vary in number in different parts of the body, but are most

FIG. IV.

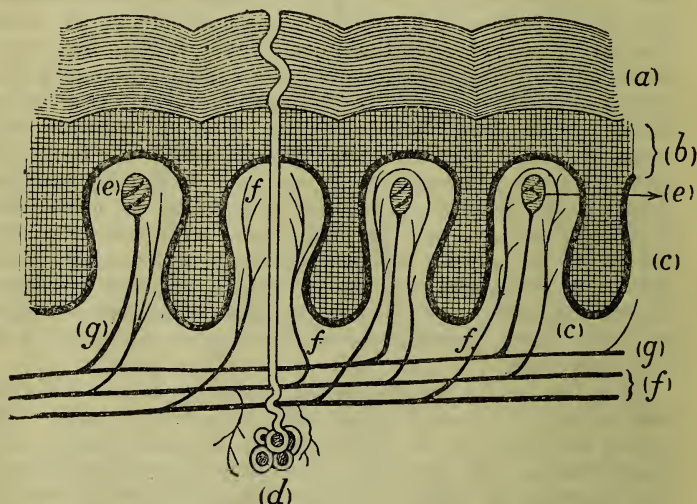


Diagram of microscopical section of skin. (a) Superficial horny layer; (b) middle or mucous layer; (c) deep layer or true skin; (d) sweat gland; (e) nerve ending; (f) blood vessels; (g) nerves.

numerous on the pads of the fingers, the palms of the hands and soles of the feet, and consequently in these situations the sense of touch is most accurate.

These three layers, when united together, constitute what is commonly called the "skin," which rests on a varying amount of loose tissue, which allows it to slide easily over the deeper structures and so escape injury. In this loose tissue beneath the skin are a number of blood-vessels and nerves, which give off branches to the skin. Also a number of little glands, in which the sweat is formed. Each gland consists of a small coil of tubing, in which the sweat forms, and a duct or canal, which pierces the three layers of the skin and opens on its surface. They are more numerous on the palms of the hands and soles of the feet than anywhere else. From their openings on the surface of the skin we are continuously exuding moisture, which

increases largely in amount when marching or taking other hard exercise.

The *nails* are but modified skin. The superficial layer has become more horny, and grows forward from a mucous layer (the matrix) at the root of the nail, which latter rests on the true skin (the quick). The skin is folded over the back and sides of the nail, and if pressed against the nail at the side may become inflamed and cause "ingrowing toe nail."



CHAPTER II.

THE COVERING OF THE SOLDIER'S FOOT.

THESE articles of clothing probably influence comfort, well being, and usefulness of the soldier more than any other portion of his attire. Their prime object is to protect the feet from injury, cold, wet, dirt, excessive wear and tear, &c. They should, while fulfilling these objects, interfere as little as possible with the free natural movements of the feet, and should in no case be allowed to compress them.

They may be classified as follows :—

- (a.) Socks and stockings.
- (b.) Boots and shoes.

(a.) The various points of importance in a sock intended for marching purposes are—

(1) It should be made to fit properly, being not too large, or else it will wrinkle and crease in the boot, especially if made of cotton material, nor too small, or else it will cramp the foot and wear into holes very quickly. The sock ought to be properly shrunk before being used for marching purposes. The socks which are being issued at the present time shrink a great deal, and therefore ought to be when new three sizes larger than the foot. If not so issued, the heel will be pulled down under the sole of the foot after a few washings. If socks were worn in barracks until after the first two or three washings, before being used to march in, this would be avoided.

(2) Socks must not be coloured with aniline or other irritating dyes, which wash out with the perspiration, and prepare the way for sore feet. The ordinary official grey is a good colour.

(3) They should vary in thickness according to the climate and season. They should be warm enough in cold weather to prevent frostbite or chilblain. Though thinner socks may be worn in hot climates, they should always be thick enough to absorb the perspiration. Speaking generally, a fairly thick sock is better to march in than a thin one. Boots should always be fitted over the thickest sock that is to be worn, and should be easy, as the feet swell when hot with marching.

When soft corns exist between the toes, the socks may often with advantage be digitated, there being a glove-like receptacle for the affected toe. This by absorbing perspiration and relieving pressure, often cures the corn.

(5) The seams of socks should be woven, not sewn, nor should any projections or knots be present.

(6) Ribbed socks are more elastic than plain, fit better, compress the feet less, and allow a freer circulation of air in the boot. They should be made of wool, or wool and cotton mixed, so as to be absorbent.

(7) Darning of holes must be carefully and properly done, so as to preserve the original size and shape of the sock, and offer no projections. Socks with undarned holes must not be worn, as the edges of the holes are apt to curl up and lead to abrasions and sore feet, especially under the toes.

(8) Lastly, but by no means of least importance, the socks should be *clean* at all times, for not only is a dirty sock hard and non-absorbent, but is a harbourer of germs, which inevitably cause swollen, excoriated and offensive feet.

Stockings are another form of sock, and only need mention with reference to the garter, which should be worn below (never above) the knee. Suspenders are the most scientific method of supporting the stocking. The Highlander's stocking is merely an ornamental top, separate from the sock, but excellent for marching purposes when combined with a sock, shoe, and spat.

The fitting of ready-made boots is a very difficult matter, as the feet of different individuals vary in all sorts of ways. The difference in thickness of the sock must be allowed for, as a boot which just fits over a thin silk sock will be very uncomfortable over a thick shooting stocking. In the army separate lasts for each man are, of course, impossible, so that care is specially necessary when fitting the boots. Only too often the young soldier is given a pair of boots about his size, and asked if they are "all right"? After trying one or both on for a minute, possibly even without standing or walking in them, he is satisfied, or thinks it best to seem so, and takes them away, only to find out their shortcomings on the first long march.

From a fancied idea of smartness, soldiers are only too fond of getting their regulation boots altered, and the toes pointed, the heels being raised and made small like those on ladies' high-heeled shoes. This practice should be severely dealt with.

The sole should be large enough (in length and breadth) to allow for the expansion of the foot on pressure and with the heat of marching, and a definite allowance must be made for this increase in size. There is no doubt that a *roomy* boot is the best for marching purposes; but if too large the foot may rub in the boot, or the crease in the boot and foot not coincide, and so gall the foot.

Above all things the sole should be *pliant*, and especially across the roots of the toes and tread, where the natural crease appears across the uppers of good boots. When soles have been "clumped," *i.e.*, when half a sole has been nailed on to the tread of the sole, the boot is very stiff just where it ought to bend, and has a tendency to give across the waist rather than across the tread. Such soles are not nearly so good for marching purposes, but are more easily mended, as the worn clump has only to be ripped off and a new one nailed on and trimmed. Though a boot should give a little and not be rigid in the waist, yet in that it is the narrowest part of the sole it is apt to be weak and give too much. To prevent this, and to support the instep, a strong shank or tongue of stout leather is inserted between the two layers of the sole, extending from the heel to the beginning of the tread, through the waist.

The sole is usually made of two layers of good leather, with a central filling. These two layers are either riveted or sewn together. Riveting may be done with metal or wooden pegs, or with patent screws. The two former are not suitable for marching purposes. The sewn soles are done by hand or machinery.

Hob nails in the sole are useful, as they help to resist wear, and harden without stiffening the sole, prevent the feet from slipping, keep the sole slightly off the wet ground, and cause it to splash less in muddy weather. They are especially useful on grass and on English roads, and cause no discomfort if evenly distributed over the sole. Heel and toe tips are also a great protection when marching, especially on rough ground, as on long marches, when tired, the soldier is apt to drag his feet and wear the toes through, and when marching in close order with other men in front of him he finds a difficulty in avoiding the stones and inequalities of the road. The sole should wear out on the outer side of the heel first of all, where it is apt to be rubbed as it comes to the ground. Next it should wear on the inner surface of the toe as it leaves the ground, and lastly in the centre (or slightly to the outer side) of the tread of the sole.

(2) The *heels* keep the feet somewhat off the ground, pre-

vent splashing, and enable us to avoid small projections, stones, &c. Though they are the first places to show wear and tear, they are easily repaired. They should be of only moderate height. With high heels the weight of the body is thrown unduly forwards on to the toes, instead of being evenly supported by the whole arch of the foot. The body is in the position of a man standing upon an inclined plane—always a fatiguing attitude. When going down hill they increase the necessity for throwing the body backwards, and are no help when ascending hills, as in that case the heel is always raised. High heels give a false impression of shortness to the foot and fulness to the instep, but, besides deforming the foot, they make it practically useless for any real work. Moderate heels have their uses; immoderate ones are an abuse.

The sole of the regulation boot is curved downwards between the heel and toe. The toe thus often stands an inch or more off the ground when the boot rests upon its sole. This is technically known as the “spring” of the last.

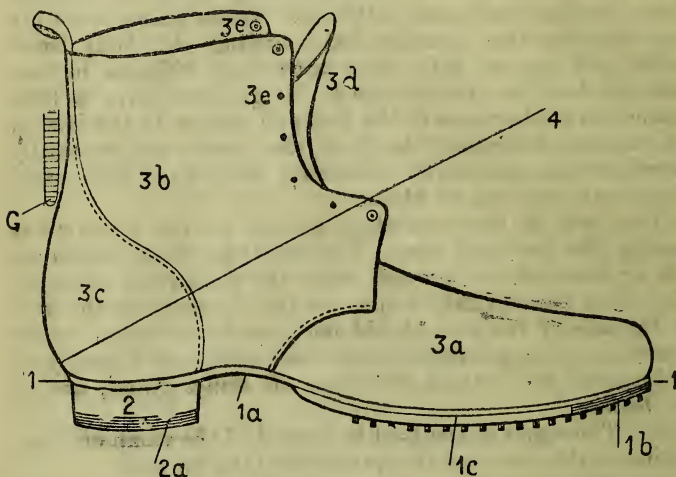
The sole of the boot should therefore be the shape of the normal foot, roomy, straight on the inner side, with a good projecting welt, fairly thick, but above all things pliant, and of good leather.

(3) The *upper* of the boot is formed of the vamp or front portion of the boot and the quarter or hind portion.

(a.) The vamp covers the toes and instep. This should be specially pliant over the natural hinge of the foot, near the roots of the toes. It should allow ample room inside the boot, over and beyond the toes, for the front portion of the foot is formed like a double wedge, which the weight of the body tends to force forwards and outwards between the sole and upper. The vamp should therefore be rounded over the toes, and blocked to fit them, and never end in an acute angle with the sole. The greater thickness of the big toe and the varying thickness of the toes in different persons has to be considered. If the boot is too short the toes are forced against the end of the boot, and to relieve this pressure they shorten by bending at the middle joint. This joint is apt to rub against the upper, and inflammation, sores, or corns result. The tendons also are apt to shorten permanently and fix the toes in this new position, causing “hammer-toe.” If the vamp does not fit in the first instance, the foot has to stretch it until it does, a process the reverse of comfortable, and one which leads to unsightly creases in the boots. The fit of the vamp depends to a great extent upon the shape of the sole, and many of the points already discussed

have a bearing upon both. The vamp is extended up in front of the ankle, as a thin piece of leather, called the *tongue*, which, passing up under the ears and lacing of the quarter, keeps out dust, &c. The tongue should be rounded and full at the top, and reach well to the top of the boot.

FIG. V.



Ankle Boot, Home Service Pattern.

1, sole ; 1a, waist ; 1b, toe tip ; 1c, tread.

2, heel ; 2a, heel tip.

3, upper ; 3a, vamp ; 3b, quarter ; 3c, counter ; 3d, tongue ; 3e, ears and lacing.

4, direction in which boot should grip foot.

G, point where gaiter may rub heel.

(b.) The *quarter* or hinder portion of the boot covers the heel and ankle joint. It should be pliant over the ankle joint, to allow freer play to that joint and to the tendons passing over it. It is made in two halves, seamed together down the back of the ankle and heel, the edges of the seam being turned outwards. In front it is prolonged over the vamp and stitched to it. The quarter must not be too high, or it will interfere with the proper bending of the ankle joint, a fact the soldier fully realises and usually allows for by leaving the two upper holes of the lacing undone. The height of the instep varies greatly in different individuals, and with it the girth of the foot in that situation, even in those whose

feet are equal in length. This has to be allowed for, so that while the numbered *sizes* refer to certain lengths of boots, each size is also made in four different *magnitudes*. These sizes and magnitudes are marked inside the ear of the quarter by figures stamped into the leather, the size above and the magnitude below, thus $\frac{8}{2}$.

The front wings of the quarter or "*ears*" are pierced with eyelet holes for lacing. They should not quite meet over the foot, so as to allow of firm pressure being made when the boot is laced. Strong, sound laces are necessary to effect this even pressure, a point which it is impossible to achieve with knotted, unsound laces.

The uppers need to be kept supple with vaseline, neat's-foot oil, dubbing, &c., as otherwise on long marches they absorb perspiration and become hard and brittle. The difficulty is to find a dubbing which will also take a polish.



CHAPTER III.

CARE OF THE SOLDIER'S FOOT IN BARRACKS AND ON THE LINE OF MARCH.

BOOTS should be fitted on *indoors*, in some long room. *Both* boots should be put on over the thickest socks that will be worn under them. If thought satisfactory, they should be laced, and the man directed to walk at least the length of the room and back before final approval. The Clothing Regulations lay down (Appendix IV) that an allowance of two-and-a-half to three sizes should be allowed in addition to the length (but length only) of a man's foot. This amount does not exceed an inch, and is ample. The height and fit round the ankle and instep should be noted as well as the length. There are four variations (magnitudes) in this respect to each size in length. These, with the sizes of length, are marked on the inner surface of each boot, so that, when once fitted, a man should know what to ask for on a future occasion. The ears should not quite meet when laced, so as to allow modifying pressure to requirements. Men with specially-formed (or deformed) feet should avail themselves of the permission to have boots specially made, as laid down in the Clothing Regulations. This also applies to those who suffer from bunions, enlarged joints, &c.

The boots should be kept properly softened, especially after getting wet, with vaseline, neat's-foot oil, dubbing, &c. Constant sweating into a boot makes it hard, stiff, and brittle. Boots should have their extreme newness worn off in barracks before being used for marching purposes. They should always be kept in good repair, as otherwise they leak, tire the feet, and often give out at a critical moment. Boots kept in store also need attention and dubbing (Appendix V). A dubbing that will polish is much needed.

Changing into canvas shoes, after a march, cools and rests the feet enormously, and allows of the boots being aired and dried. This shoe should have a good sole, similar to that of the hospital ward shoe. The extra cost of a substantial sole is amply repaid on active service or long manœuvres, as the cheaper sole soon falls to pieces.

Wet boots should be changed *as soon as possible after a march*, and arrangements put in train for drying them slowly, after which they should be oiled. It is often a good thing to oil or vaseline the boots while still warm from the

feet. The pores of the leather absorb more while in this state. Waterproofing should be avoided, it is apt to make the boot too impervious and to confine the sweat inside the boot, so poulticing and softening the feet.

The socks should equally fit, allowance being made for shrinkage, and the other requirements already laid down fulfilled. They should always be kept in repair, the edges of holes being apt to curl up and cause mischief. All darning should be close, even, and free from projections. The socks should be *clean*, as dirt not only causes stinking feet, but is at the bottom of most if not all of the inflammation, abscesses, or even blood-poisoning, that may attack the feet and follow even slight abrasions. Such disabilities totally incapacitate the soldier from marching, and may lead to danger to life and limb. At least two pairs of socks should be kept in use. In barracks these can be changed once a day or worn on alternate days, and washed once a week. On the march they should always be changed on the completion of the day's march, hung up to air and dry, and be washed out as often as time and opportunity permit. With clean socks and feet and properly fitted boots the common ailments of the feet will cease to exist.

Gaiters should not gall the heel. In such cases the last button may be undone and the gaiter allowed to fall slightly on the boot. If putties be worn, a spare pair should be carried, so that they can be regularly brushed and aired and, when necessary, washed. The men should be instructed in the best method of putting them on, so as not to slip nor be too tight.

Above all things keep the feet clean. Plenty of soap and cold water once a day will do much to make the feet hard and tough as well as clean, and is worth any trouble that its proper supervision may give rise to. Men with tender feet can often march if they have them previously greased or rubbed with soap. The outer surface of the sole of the sock may also be soaped. Some feet are much aided by being rubbed all over with zinc (or boracic) ointment, or antiseptic vaseline. A plentiful supply of such medicaments should be taken on the march, and served out freely to medical orderlies and even colour-sergeants of companies, and men with very tender feet can carry a small tin box full. These are often sold in canteens, and bought individually or regimentally, and carried by men on manœuvres.

Veterinary vaseline, which has been much used for the feet on recent manœuvres, is merely a cheaper form of medical vaseline. It is not antiseptic or medicated, and has

no special quality beyond its cheapness, and is therefore only a commercial variety of vaseline.

The feet may be hardened and made fit for marching purposes in many ways. Bathing in cold water and a generous use of soap has been mentioned, but is worth reiteration. The socks and feet should be kept as dry as possible. The feet may be soaked regularly overnight in salt and water, alum and water, or saltpetre and water, about a handful of any one of them in two quarts of water. Spirit and water (equal parts) may be used for the same purpose.

Toe nails should be kept trimmed and cut *square*, i.e., straight across.

Any tendency to corn, ingrowing toe nail, or bunion should be at once attended to before it becomes serious.

Comfortable boots and cleanliness are the key to prevention of the diseases to which the soldier's foot is liable.



CHAPTER IV.

THE NATURE AND TREATMENT OF THE COMMON AILMENTS TO WHICH THE FEET ARE LIABLE.

(a.) *Inflammation and Swelling.*—Whenever a portion of the body is injured or irritated in any way, certain changes occur at the injured place, associated with an increased flow of blood to the part. This is characterised locally by redness, swelling, heat, and throbbing pain. The causes of such injury or irritation may vary, such as :—

- (1) The rubbing by a seam in the boot, a wrinkle or knot in the sock, some grit in the boot, &c.
- (2) When, by neglect of due cleanliness, the sweat is allowed to collect on the surface of the skin, and, for want of removal with soap and water, becomes concentrated.
- (3) Burning, scalding, frostbite, chilblains, &c.
- (4) Germs, which play a great part in the irritation and offensiveness of dirty feet. These small creatures, invisible to the naked eye, thrive in moist, warm, dark, and dirty places, such as an unwashed foot! They not only irritate the foot when softened by the heat and perspiration of marching, but when cracks or wounds are present they get into them and give rise to inflammation, formation of matter (abscess), gangrene (mortification), and even general blood poisoning.

All or any of these agencies will cause the foot to become, in the first instance, red, hot, painful, and tender. There is at the same time an increased formation of sweat, which further softens the skin, and the skin and foot become somewhat swollen.

(b.) *Blister.*—The common blister; its size and shape depends upon the nature and severity of the cause which has brought it into existence. In the foot it is most often met with under the heel or just above it, where the heel has been rubbing up and down in the boot on account of bad lacing or too large a boot, some internal projection, or the irritation of the lower edge of the gaiter. Others are met with on the sides of the foot or where the side of one toe rubs the next, or

Natural
cure.

across the sole of the foot. If the source of irritation which caused the blister be removed, and the blister left to itself (the foot being rested), the fluid will be gradually absorbed, and all is well. The raised layer of skin will not be rubbed off until that beneath has become hard enough to replace it. This natural cure may be much hastened, as will appear later.

(c.) *Abrasion*.—If the irritation be very severe or long continued, it may, according to its severity, either rub the layers of the skin away before a blister has formed; or, after the blister has formed, may rub the horny layer right off. In either case, the soft, sensitive, deep layer of the true skin is exposed, covered only by what remains of the soft mucous layer. This constitutes a simple abrasion of the horny layer of the skin.

(d.) *Ulcer or Sore, Cut, Wound, &c.*—If the abrasion extend deeper into the third layer (or true skin), an ulcer or sore results. This may be the result of more severe friction than that which caused an abrasion, or of some wound or cut with a sharp stone or other instrument (piece of glass). Such sores get worse and worse, so long as the original cause remains; but if the cause be removed, the skin all round the edges of the sore becomes very energetic and gradually grows inwards over its surface. For this to happen, however, the sore must be clean and free from germs. If dirt and its germs are allowed to get in and stay there, they set up irritation and inflammation, prevent healing, and may even burrow under the skin or down the blood-vessels and cause abscesses, gangrene, and even general blood poisoning. For this reason scrupulous cleanliness is absolutely necessary, whenever and wherever actual sores (or even abrasions) exist; and antiseptic lotions and ointments are extremely useful aids to speedy healing.

(e.) *Punctured Wound*.—This is mentioned separately to impress upon you its importance. When a sharp thorn, nail, pin, &c., is run into the foot, the seriousness of the wound is often greater than the actual injury would appear to warrant. The reason is that some dirt, rust, or other matter containing poisonous germs may be carried deep into the skin and left there, or a piece of the material itself may be left behind. Such material, deep in or under the skin, will set up inflammation or even abscess, though if the puncturing instrument be quite clean and free from germs no such condition will be set up. The hard thick skin of the sole prevents any matter formed under it from escaping outwards, and the small external opening

usually closes and disappears. This matter may burrow and give rise to serious damage to the sole of the foot. On the other hand, this same thick skin is a great protection from injury, as the thickness is in the superficial horny layer. Punctures into the horny layer are not serious; those extending through the mucous layer into the true skin are exceedingly serious and need medical supervision.

Treatment.—(a.) The treatment of tired, swollen, and inflamed feet is to first of all remove the boots and socks. If possible the feet may then be placed in warm water for a few minutes, or, at any rate, washed and well dried. The only drawback to warm water is that, though it eases the pain, it has a temporary softening action on the feet, and so must not be used just before a march. It does no harm the night before or after a march. A clean pair of socks and a dry, easy pair of shoes or slippers, and a rest with the feet raised, will usually set matters right. When the feet are tender and easily inflamed, precautions should be taken before the next march, such as keeping the feet and socks clean and dry, the boots roomy and soft, &c. The soles of the feet and socks may be soaped, or the feet greased with zinc, boracic, or other ointment, with or without a bandage under the sock. If a bandage be used, the boot must be large enough to contain the extra thickness. The feet may be hardened by soaking in salt and water, or saltpetre and water (a handful to two quarts of water), alum and water, tannic acid, &c. Oxide of zinc or other powders may be sprinkled over the foot before the sock is drawn on. Any tendency to "sweaty or stinking foot" must be attended to.

(b.) Should a blister be raised, remove the boot and sock and ascertain the cause of the blister and at once remedy it. Often it will be found to be some projecting seam or wrinkle in the lining of the boot or of the sock. If it is caused by the curled-up edge of a hole in the sock, he should change the sock, or, failing that, after greasing the foot with zinc ointment, it may be advisable to dispense with the sock.

Next the fluid must be drawn from the blister. This used to be done by puncturing the thin covering of the blister with a needle, or passing the needle, threaded with worsted, through the blister and leaving the worsted until the fluid had all disappeared. Such methods weaken the thin covering of the blister, after which it is apt to give way and leave the extremely sensitive mucous layer (and true skin) exposed to the rubbing of the sock and boot. In such a case the man will find great difficulty in marching,

and the simple abrasion which results may rub into an ulcer or sore. The best method is as follows:—"A clean needle,* knife, or other pointed instrument should be inserted into the sound skin, about an eighth of an inch beyond the edge of the blister. The needle is then passed horizontally into the blister, and, if raised, the fluid will run out beneath it. When as empty as possible, the skin protecting the blister should be carefully flattened down, and some cotton-wool, lint, or anything that will exert soft pressure, placed over it, and fixed by some strong strapping." This will protect the tender layers of the skin from pressure or injury until such time as the new horny layer has formed beneath that raised by the blister and is able to take its place. The puncture must be made through the horny superficial layer of the skin, and not go deeper. Should the blister refill, the operation can be repeated. All the materials needed are simple, and the best plaster for the purpose is the American indiarubber plaster to be found in the Army field pannier. After removing the cause, evacuating the fluid, and dressing the blister, the place may be greased with ointment or vaseline to prevent friction. When treated in the above manner, the soldier is usually able to continue his march in comfort.

(c.) An abrasion should be treated without delay, lest it get worse and pass into the severer condition of an ulcer or sore.

(d.) The latter being but a further extension of the mischief, may be classed with the simple abrasion for treatment, except that it needs more care and attention and will last much longer.

First of all the cause must be sought for and removed. Usually it is on the side of the heel, or above it, where the edge of the gaiter rests, or elsewhere.

The abrasion or sore must next be cleaned with some antiseptic lotion, to remove any dirt or germs that may be present, and to prevent their setting up inflammation or entering the deeper tissues. A simple abrasion or sore is bad enough, but one that has become inflamed is often painful enough to quite prevent the soldier from marching.

It must next be dressed with some antiseptic ointment, zinc or boracic, or with antiseptic vaseline. This should be spread upon lint as well as on the sore, the lint being placed (ointment side down) on the sore, and fixed there with strapping and the sock drawn on over it. It is well to have

* Though any needle will suffice, a three-edged surgical needle is the most effective instrument.

the lint much larger than the sore, but care must be taken that it does not ruck or wrinkle in the sock. The socks must be regularly changed and kept clean. So treated, provided the sore is not deep or inflamed, the soldier will usually be able to march.

Wounds and cuts must equally be kept clean and free from germs. If of any size they should be shown to the medical officer at once, who will decide upon the nature of the dressing. In his absence, or if of a trivial nature, they should be washed with antiseptic lotion (such as weak carbolic lotion 1 in 40, boracic lotion, &c.), or with boiled water (*never* with ordinary water, which too often contains injurious germs), until the bleeding has stopped, and then be protected by a dressing of antiseptic gauze or cotton-wool, bound firmly on. Failing this, ointment or antiseptic vaseline may be applied. Where the above materials are not available, for the treatment of abrasions, sores, or wounds, it is best to wipe away any dirt or blood, and protect the place with some clean dry cotton-wool, lint, or a clean handkerchief bound firmly (but not tightly) round, until it can be properly dressed, carefully abstaining from washing it with ordinary water and keeping it out of mud, dust, or wet.

(e.) The same applies to punctured wounds, but for the reasons already explained, such wounds involving the deep layers of the skin should always be brought to the notice of the medical officer, and kept under observation, as abscesses may form later.

(f.) Abscesses beneath the skin, or in the deeper tissues, result from some dirt having gained entrance, and its germs setting up inflammation. An abscess is characterised by acute throbbing pain, tenderness, redness, local heat, and possibly by the fluctuating feeling of a collection of fluid (matter or pus) under the skin. Such a collection of matter needs to be let out, but the operation is not so simple as in the case of the blister, and important structures may be injured. It should therefore be referred to the medical officer. Should such an abscess burst spontaneously before being opened by the medical officer, it should be treated and dressed in the manner recommended for a sore or wound, except that as it will discharge for some time, a certain amount of lint, gauze, or cotton-wool (antiseptic if available) should be bound over it to absorb the discharge. The dressing must also be removed, the place cleaned and redressed regularly.

(g.) *Corns* :—Corns are termed “hard corns,” commonly

met with on the sides of the toes, on the heel, under the tread of the sole, and occasionally on the ends of the toes, and "soft corns" which are most common between the toes.

Occasionally a minute bag of fluid may collect under an old and thickened corn. Such a corn is very liable to become inflamed, when matter may form in the small space between the corn, which, owing to the hardness of the corn, cannot escape or come to a head. This is essentially a case for the medical officer.

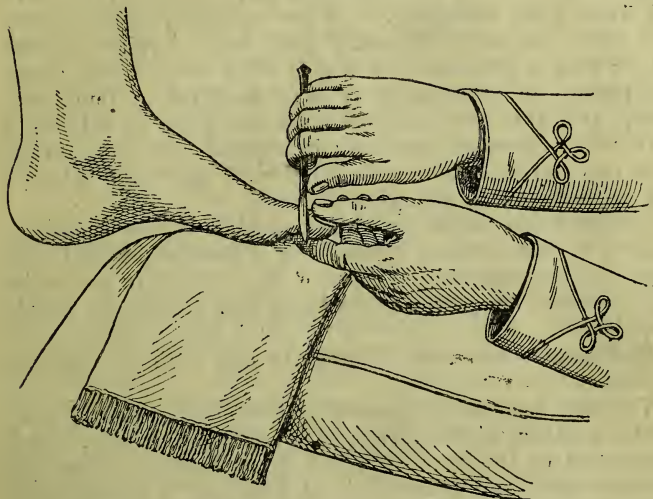
A corn may occur over a bunion and prove a most painful condition. It will be further dealt with when the bunion is considered.

Treatment.—As corns result from undue pressure on some small spot of the skin, the first thing necessary towards a cure, is to remove that undue pressure, or at any rate equalise it as much as possible. Though some persons are more susceptible to corns than others, it is not necessary for any ordinary healthy soldier to suffer from corns on his feet, any more than on any other part of his body. As surely, however, as he wears tight boots, so surely will he suffer from corns. The rectification of the offending boot, if combined with removal of the corn, will lead to a cure, but one is no use without the other. First, therefore, investigate and remove the defect in the boot which produced the corn. The next proceeding is to operate on the corn and remove it. To do this, the patient should be seated on a high chair (or table) in a good light. Seat yourself at a lower level and place his foot on a towel on your knee. Next *examine the foot and corn thoroughly* and make up your mind as to the extent to which you will operate, *and examine each corn so as to be sure it is a corn* and not a general thickening over a prominent joint (hammer toe). Select a sharp knife with an even flat blade about an inch to an inch and a half long. Grasp it firmly in the right hand, the blade being horizontal (flat) with the fingers over the handle, as you would hold a dinner knife (*not as a pen is held*). The end of the handle may be passed between the fourth and fifth fingers to aid in steadying it. The pad of the thumb pressed firmly against the back of the blade at its junction with the handle.

Next grasp the foot or toe firmly with the left hand, in such a way as to fix the side of the corn nearest to you with the thumb. Holding the blade of the knife flat (horizontal), the edge being slightly depressed as the razor is held when shaving, gradually shave or pare away the extra horny material that has formed in the superficial layer.

This should be done slowly and evenly, using the centre of the blade and not its point, until the skin over the place has become the same colour and thickness as the surrounding skin. *Remember that the corn is formed in the superficial horny layer, and on no account must you go deeper or wound the mucous layer or true skin underneath. Any bleeding which takes place is a sure indication that you have gone too far. Should it occur, you must treat it as a wound.*

FIG. VI.



Method of using knife when removing (*i.e.*, paring away) a corn.

After washing the place with some carbolic lotion, sprinkle on it a little boracic powder and cover with boric wool and strapping. If you wound the skin in this way and it becomes inflamed you will be blamed, and if it gets poisoned and abscess or gangrene result you will not easily escape the consequences, so be very careful to so hold the knife in such a way that only the corn is removed by successive thin shavings.

Never operate on an inflamed corn, but first reduce the inflammation by cold water dressing, zinc ointment, or lead lotion, and show it to the medical officer. No man should cut his own corns.

Some persons prefer to first soak the feet in warm water and then to peel out the hard corns. This needs less skill, but is not so satisfactory.

In dealing with *soft corns* between the toes, we must aim at relieving pressure, and at the same time absorb the sweat and remove the corn. Wider toes to the boots, cotton-wool pads between the affected toes to prevent them being squeezed against each other, lambswool pads or digitated socks all give relief. The corn should be scraped away in a similar manner to the hard corn, but care must be taken not to cut the adjacent toe or the folds of skin at the roots of the toes. A curved or belly-bladed knife is useful. Instead of operating, a corn plaster may be put on the corn and fixed with strapping. When removed two or three days later the corn will easily peel out. A piece of soft leather with a circular hole in it is often used in this situation, though in other parts it is of doubtful or temporary utility, as it only relieves pressure in one place by shifting it to another. Between the toes it absorbs the perspiration, while the central hole may be filled with powdered salicylic acid, with a view to softening the corn.

Inflamed and gathering corns should be shown as soon as feasible to the medical officer, who alone should deal with them. In the meantime a piece of lint, soaked in antiseptic lotion, covered by gutta-percha tissue and a bandage, should be applied.

Chilblains.—Are most commonly met with on the toes and heels.

The skin becomes congested and swollen in one or more circular patches, with severe itching and burning pain, which is increased by the heat of a fire or by exertion. The skin becomes thick and brawny, is at first red in colour, then crimson, purple, and even livid. If very severe, fluid may exude beneath the skin, and a blister form. This may break, and an unhealthy abrasion or even a gangrenous sore result.

Treatment.—Where chilblains threaten, the circulation of the skin should be encouraged by gentle rubbing, by a judicious amount of exercise, and by wearing dry, warm boots and socks. Sitting over the fire (after getting the toes chilled) in wet cold boots is generally at the root of the matter. The chilblains may be dressed with zinc ointment, and protected with cotton wool. Lead and opium plaster on wash leather is an excellent dressing. Night socks may be worn.

Should a blister form, the fluid must be evacuated and the place dressed with antiseptic ointment and a protection of soft cotton-wool. Any sign of acute extending inflammation or mortification is a serious matter, and one that should at once be brought to the notice of the medical officer.

Frost-bite.—This is the result of the action of extreme cold upon any portion of the body, and is an extension of the chilblain into a far more serious condition. It also attacks extremities, the tissues affected being literally frozen, hence it rarely occurs except in very cold weather and frigid climates. There is transient redness and tingling in the toe or toes affected, soon followed by purplish lividity and diminished sensation. Next blanching and numbness succeeds, and lastly coagulation takes place, the tissues become hard, white, and absolutely insensitive. If the circulation be gradually restored the toe may recover. If not, either the part affected shrivels up, dries, blackens, and finally falls off, or the part may become inflamed, and gangrene set in and even spread up the leg. There is usually some weakness left behind in portions of the body that have been frost-bitten for a considerable time, even after the circulation has been restored and apparent recovery taken place.

Treatment.—This consists in *very gradually* restoring the circulation. The greatest care and patience is necessary, as any attempt to restore the circulation too quickly may do more harm than good, as the blood vessels get over full and choked, so that the circulation in them is blocked: The person affected with frost-bitten toes should be laid down in a horizontal position in a moderately cold place, and not brought indoors at first, until the circulation has been somewhat restored, and on no account brought into a warm room or near a fire. The affected parts should be raised, and gently rubbed with snow or bathed in cold water. Very gradually the temperature of the water should be raised to tepid temperature, after which dry friction or rubbing with oil should be employed. This friction should extend to some distance from the affected part. When the circulation is somewhat restored, friction may be alternated with wrapping up the part lightly in cotton-wool, fur, or flannel. This friction should be repeated at intervals and kept up for some days, the part being warmly clad. Special care will also be necessary, for years if not for life, for toes or other portions of the body that have been affected with frost-bite are left in a very vulnerable condition. Further treatment is a medical question, but so much may be done by a bystander, that it is worth knowing the best course to pursue.

Wet feet.—Wet boots lead to hardening and stiffening of the leather, rotting of the stitching, wrinkling and hardening of the socks, and so to friction, inflammation, blisters, sores, &c. Also when allowed to remain on the feet, after the cessation of active exercise, they not only chill the feet

but also the whole body ; leading, especially when worn out, tired and hungry, to a lowering of the general vitality, and a condition in which we are prone to catch any acute disease to which we may be liable, such as rheumatic fever, sore throat, &c. The danger is not while we are on the march, when our feet and bodies are kept warm by exercise, but when sitting still afterwards in cold, wet boots.

The remedy, which is obvious, consists of keeping the boots in good repair, and changing wet boots and socks on the first opportunity after the march. After being dried such boots need dubbing or vaseline, &c., to soften them.

Sweaty Foot.—In some persons the production of sweat is excessive, so that when marching their socks and boots become soaked with moisture, the feet sodden and inflamed. In many cases it is often due to uncleanness, the dirt and sweat becoming daily more concentrated and more irritating, and so causing a greater flow of perspiration.

Not only are sweaty feet exceedingly unpleasant, both to their owners and to those who must be near them, but they are in addition soft feet, and so specially prone to all the ills that feet are heir to.

Treatment.—For sweaty feet absolute cleanliness and a generous use of soap and water is of the first importance. Absorbent socks should be worn and frequently changed. The frequency of changing will depend upon the severity of the condition, and will necessarily differ with different individuals. In all cases another dry (and when possible a clean) pair of socks should be put on each morning, and again at the end of any march. The pair used during the day, or march, can be washed out or at least dried ready for use next time. The boots must also be well dried and carefully dubbed or softened. A second pair of boots, or at least a pair of canvas shoes, should be carried, for use at the end of the march, by all affected with such feet. Bathing the feet with vinegar and water, alum and water, spirit and water, or with lead lotion often helps to check excessive perspiration. Under medical supervision, tincture or liniment of belladonna may prove useful.

Ingrowing Toe Nail.—This extremely painful condition usually affects the great toe. It is the result of either wearing boots with sharp-pointed toes, in which the side of the boot presses the soft skin of the inner side of the toe on the sharp edge of the nail ; or occasionally a nail which has begun to grow to one side may press the skin overlapping between it and the boot or next toe. This irritates the skin, which is pressing on the nail, giving rise to in-



FIG. VII.

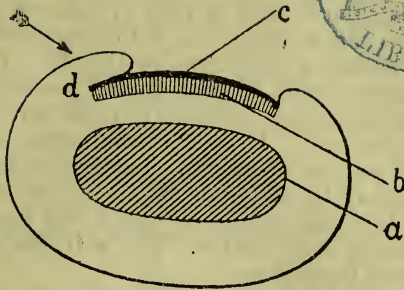


Diagram of section of great toe with ingrowing toe nail at *d*; the pressure has been from a sharp-pointed boot in the direction of the arrow. *a*, Bone; *b*, matrix or bed of nail; *c*, nail.

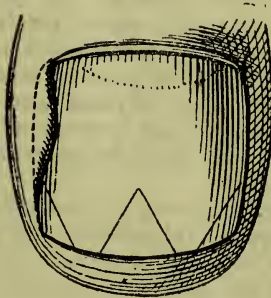


Diagram of operation for ingrowing toe nail not completed yet.

flammation, friction, and even abrasion or ulcer. The sharp edge of the nail continuing to press and rub against this raw place, causes much pain and leads to matter being formed and even to a growth of proud flesh under it. This goes on from bad to worse, until the sufferer cannot stand without pain. The condition is only too common in the army, and gives much trouble both to the patients and to those whose business it is to cure them.

Treatment.—The pressure of the pointed toe of the boot must be removed and a square-toed boot used; unless this is done, any treatment will be of little or no avail. Nails cut square are less likely to develop into this condition than when the corners are trimmed and the nail round.

When present a $\wedge$ shaped piece may be cut from the centre of the free end of the nail with nail nippers, the sides

of the nail, especially on the ingrowing side, removed with the same instrument and a pair of dissecting or spring artery forceps, and all deposit and dirt removed from under and around the nail with the end of the file. The point of the nail nippers should be kept up and pressed against the insensitive nail, so as not to injure or press on the sensitive quick under the nail. If done carefully this should be a bloodless and painless operation. Lastly, a cap of thin soft wash-leather may be drawn over the toe as a protection. The seam of this cap should be above and have its edges external and away from the toe. The nail file may be used to round off any projections.

Another method is to scrape the surface of the nail with a knife or piece of glass till as thin as paper, removing any deposit from underneath and as much of the sides as possible. The nail may be softened during this operation with a 40 per cent. solution of caustic potash. In either case cotton-wool should be packed tightly under the free end and sides of the nail to elevate it and encourage it to grow in a new direction; this may be kept in place by strapping. If ulceration be present, small pieces of sheet lead or tinfoil may be inserted under the edges and corners of the nail and kept there by strapping, the place being treated with zinc or boracic acid or powder.

Exuberant proud flesh may be touched or rubbed lightly with sulphate of copper (bluestone). If the nail continues to irritate the skin, the case may need to be operated upon by the surgeon, and the nail removed under cocaine or some anæsthetic.

Bunion.—When pointed-toed boots are worn the great toe is forced towards the other toes, and instead of being straight or inclined slightly away from the other toes (as is its natural position) the free end is forced towards the middle line of the foot. This tilts the head or joint of the toe outwards. The pressure of the boot on the tilted-out great toe irritates the bursa covering the joint, which becomes thickened, enlarged, and often full of fluid. Occasionally inflammation may go on to formation of matter and an acute and painful abscess result. After a time the joint adjusts itself to its new position and becomes permanently fixed there, and from constant pressure and irritation the bones may also get enlarged. The whole disease is very painful, and apt to get worse on very small provocation, besides being very unsightly.

Treatment.—The only lasting treatment is to provide the sufferer with a wide-soled boot, with roomy square toes and

broad, low heels. A few patches of leather may be nailed on the last to make room for the tender joint, if boots are being made specially. The toe may be encouraged to grow straight by a pad placed between the great toe and the next, the so-called toe post. Should matter form, a surgeon must deal with the case, and indeed in any pronounced bunion he should be consulted.

When a corn exists over a bunion, if not inflamed, the corn may be removed; but if the bunion be tender or inflamed, it should be treated before the corn is tackled.



APPENDIX I.

HINTS TO INSTRUCTORS IN CHIROPODY.

The three best methods of imparting knowledge are by (a) diagrams, or, if you are able to draw even roughly, by figures on the blackboard; (b) actually showing specimens or patients to your pupils, and performing, and making them perform, the necessary manipulations; and (c) testing their knowledge by asking them questions. Besides these methods they will also learn much from actual lectures and by reading their text-book at home.

The best way of dividing the instruction (which should extend over at least 23 working days, including about two hours each day) is to commence each day with from 20 to 30 minutes' systematic instruction, which by means of diagrams and a blackboard should deal in turn with the whole subject. It is a good thing to commence each lecture with a short summary of the preceding one. This arranges the subject in their minds, recalls points of importance to their memories, and gives a few moments' grace to any pupil who may be unavoidably late. This should be followed by a practical demonstration, lasting one hour, on actual patients suffering from pedal disabilities. The demonstrator should aim at giving a sort of short clinical lecture on each case, indicating the suitable treatment, and then actually carrying it out in the presence of the class. At the same time each pupil should be taught how to sharpen his knives, and should practise upon pieces of cork or carrot. Gradually the work may be handed over to the more expert pupils, and finally to each member of the class in turn, the demonstrator keeping a careful eye on what is being done. In this way each man will have become proficient and self-reliant before the end of the course, or proved that he is not suited for such work. Finally 10 to 15 minutes should be spent in testing their knowledge by *viva voce* questions, the last portion of the time being spent in answering any questions they may wish to ask.

It is a good thing to set a practice paper (four to six questions) at the end of each week, which they can answer out of hours. This accustoms them to such work, tests their knowledge, and gives the instructor some idea of each man's progress. In the final examination a large proportion of marks should be given for actual practical expertness (say, 50 per cent.), and the remainder for knowledge shown in a written paper and a short *viva voce* examination.

APPENDIX II.

REGULATIONS FOR CHIROPODISTS.

Keep the hands and instruments scrupulously clean.

Let your knives be always sharp.

Never draw blood.

Avoid hurting your patients.

Confine your operations to the superficial (horny) layer of the skin and its modifications (nails, &c.).

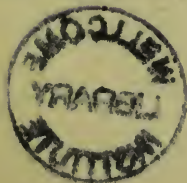
Thoroughly examine the part before commencing to operate.

Never operate on an inflamed part.

When in the least doubt at once appeal to a medical officer for advice.

Endeavour to persuade all patients to remedy the causes of their disabilities.

Always inculcate and practise extreme cleanliness.



APPENDIX III.

LIST OF INSTRUMENTS AND MATERIALS REQUIRED BY A
REGIMENTAL CHIROPODIST.

Scalpels:—

Ordinary	2	} 4
Fish belly	1	
Sharp pointed straight	1	
Nail pippers, pair	1	
Scissors, fine blades (cuticle), pair.. .. .	1	
Nail file and pick combined	1	
Forceps (dissecting).. .. .	1	
Scissors, dressing, pair	1	
Hone and strop.		
Case or pouch for above.		

Lint, boracic.

Wool „

Wool, cotton.

Gutta-percha tissue.

Strapping, tape, in tin box.

Belladonna plaster.

Bandages, woven.

Boracic acid powder.

Alum, powdered.

Boracic lotion and cup or tin mug.

Boracic ointment.

Zinc ointment.

Vaseline.

Chamois leather.

Tin to hold above in barracks (a biscuit tin or even small wooden box), or a small haversack on service, to be replenished from the field hospital.

A book in which to enter names, corps, dates, and diseases of cases treated.



